ENGINEERING ABSTRACTS

AEROTOPOGRAPHY

Colonel C. H. Birdseye, a graduate from Ohio State University and President of the Aerotopograph Corporation of America, presented an address to the American Society of Civil Engineers' Convention at Sacramento, California, April 24, 1930, on the possibilities afforded by the new art of aerial mapping.

Aerotopography is the science of making maps from the air without the long, drawn out, laborious effort of the ordinary land survey.

Any proper use of aerial photography will depict the surface of the ground with a greater degree of accuracy, particularly in minor detail, than can be accomplished by the older ground survey methods.

In details of drainage, culture, and contours an aerotopographic map excels all other known methods, principally because it traces continuous lines rather than plots individual points, which must be connected up later by hand. Thus the human element and the personal equation of the operator are largely eliminated.

An aerotopographic map requires fewer ground operations than any other known method, as it does not need ground-control points on each pair of photographs, and consequently a survey can be made with a minimum degree of expenditure for ground work. Then, the ground-control points may be placed entirely outside a reasonably restricted area, so that the mapping operations may be carried on without a great amount of publicity.

The speed with which a map can be completed reaches a maximum in aerotopography. This one factor alone justifies it, as speed is of prime importance in the production of a map.

The Hugershoff Aerocartograph is the main instrument used in the reproduction of an aerial photograph. This instrument constructs contour maps from aerial photographs by optical and mechanical means. This intricate instrument involves the use of the stereoscopic principle, measuring elevations and distances instrumentally in a stereoscopic field secured from pairs of overlapping photographs. These measurements are then drawn and plotted to the scale desired on the map sheet placed on the drawing board in the base of the instrument. Thus a complete topographic map is made entirely in the office. This instrument is built with scientific accuracy and employs the most modern developments in aerial stereoscopic mapping.

EUROPEAN SUBSIDIES

The heavily subsidized airways of Europe are due for a show down, in Germany at least. Germany's minister of communications, who controls commercial aviation, has announced that in the future only four aircraft manufacturers will receive subsidies from the government. These four are Junkers, Dornier, the Bayrische Flugzeugwerke, and Heinkel. Such big firms as Rohrbach and Albatross are now thrown on their own resources. Aircraft subsidies have always been a subject for argument in this country and it will be interesting to watch the result of the Reichstag's decision.

SUBMARINE SAFETY ADVANCES

Because of many appalling submarine casualties in the last few years, the United States Government has made the S-29 a floating laboratory for testing sub-sea safety devises and extensive experiments will be carried on this summer in San Diego Harbor. The most valuable device at present is the Munsen "lung," which permits the crew to rise to the surface without danger of suffocation. Lifting devices, hatchways, and telephones are some of the apparatus being developed.

MOVIES TAKE ON COLOR

Now that the talkies are here, the next accomplishment of the movies is natural color. All sorts of schemes have been tried, from hand tinting the individual frames to the simultaneous projection of two films. Most of these proved unsatisfactory, however, and it was only when Technicolor was introduced that colored movies became popular. Technicolor now has a competitor—Photocolor—which claims many advantages. In its production a double-lensed camera is used and the film is operated at two and a half times its normal speed, as two frames of film are exposed simultaneously. The pictures are exposed through color filters, and printed on double emulsioned films.

MORE ABOUT BOULDER

The Colorado drains an area equal to New England and the Middle Atlantic States. The northern part of the basin is elevated from 4000 to 8000 feet. The southern part is low, being below sea level in some places. At present more than 2,000,000 people live in the whole watershed.

The dam proposed for Boulder canyon will be from 675 to 700 feet in height. The lake above it will be 115 miles long, and will contain 29,000,000 acre feet of water.

—*Engineering News-Record.*

RADIO CONTROL OF AIRPORT LIGHTS

The provision of adequate lighting for emergency landing fields has been one of the salient needs of the aviation industry. If a suitable type of radio control were available, all the emergency fields might be equipped with lighting equipment to be controlled from the plane while in flight.

The apparatus developed by Mr. Belgrave Goslin has this for its purpose and is reported to have worked well under the most rirgid tests. The transmitter part of the system consists of a 15-watt multa-stage arrangement. t is located at any convenient place on the ship, and the control panel is on the instrument board. On stage of the transmitter is the modulator which modulates the 1875 KC carrier wave at a choice of several radio audio frequencies which are generated by an audio oscillator. The receiver at the landing field employs a band pass filter tuned to the frequency to be used. This filter feeds into a relay which controls the lighting circuits of the field.

In operation, the pilot sets the audio oscillator of the transmitter to the frequency to which the

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receiver is tuned at the field where he desires to land. He presses the button, transmitting the modulated signal, and then waits for about fifteen seconds for the time relay at the receiver to function. The next signal trips the relay and turns the light off. It is said that the equipment is very satisfactory and is fully automatic, in the true sense of the word.—Q. S. T.

THE ENGLISH CHANNEL TUNNEL

A majority of the committee appointed to study the practicability of a tunnel under the English Channel have reported quite favorably, although rather cautiously, on the project.

Present plans call for a tunnel under the narrow Straits of Dover to provide a continuous railway route between London and Paris. It would be 36 miles long, from portal to portal, and actually 24 miles under the sea. The depth of the water along the proposed route is from 120 to 200 feet and the tunnel would be 120 to 250 feet below the bottom of the sea. The approaches would be laid out with grades varying from 0.8 to 1 per cent while the Channel grades would be from 0.4 to 0.11 per cent.

Quite a bit of litigation on the part of railways connecting with the Channel ports is anticipated should the government offer financial assistance to the Channel Tunnel Company.

Test borings indicate no serious engineering difficulties that might be encountered. Indeed, study tends to show the continuation of the solid chalk rock found on both sides of the Channel; this material may be readily excavated. Moreover, the test borings do not show the presence of rock fissures or faults which would lead to technical troubles in construction. Fissures filled with gravel might be handled by churning the material with water and then pumping it out; the estimates, though, provide for removing the muck by cars.

Consulting engineers propose the construction of a 12-ft pilot tunnel and a 7-ft drainage tunnel across the entire route before commencing work on the two main 18½-ft. tunnels. The pilot tunnel would provide for investigation purposes as well as for the construction railway after the approval of the final plans.

Using rotary excavators, it is estimated that the preliminary tunnels could be driven in five years; the main tunnels would require three years extra for completion. The entire project, exclusive of land, stations, electric generating plant, and electric locomotives, would cost $154,500,000. This figure includes open-cut approaches and electric signaling equipment.

This is a sixty-year-old project and has made no progress because of its military aspects. Both the British and French governments, however, granted concessions to engineering companies as far back as 1875, but operations were stopped after a few trial shafts were sunk. In spite of all current peace talk, both of the parties concerned view the revival of the project with more or less suspicion, even with elaborate plans for destroying the tunnel in case of emergency. At any rate, it presents a wonderful engineering project and a great deal of material for discussion.